



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/544,992	04/06/2000	Brian Mitchell Bass	RAL9-1999-0140-US1	9200

25299 7590 08/13/2003

IBM CORPORATION
PO BOX 12195
DEPT 9CCA, BLDG 002
RESEARCH TRIANGLE PARK, NC 27709

EXAMINER

LY, ANH

ART UNIT	PAPER NUMBER
----------	--------------

2172

DATE MAILED: 08/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/544,992

Applicant(s)

BASS ET AL.

Examiner

Anh Ly

Art Unit

2172

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07/31//2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 and 35-51 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-13 and 35-51 is/are allowed.
- 6) ☒ Claim(s) 14-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)):
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892).
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☒ Interview Summary (PTO-413) Paper No(s). 16.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Response to Amendment

1. This Office Action is response to Applicants' communication filed 07/31/2003.
2. Claims 52-59 have been cancelled.
3. Claims 1-24 and 35-51 are pending in this application.
4. Claims 1-13 and 35-51 are allowed.

Allowable Subject Matter

5. The following is a statement of reasons for the indication of allowable subject matter:

The claimed invention is directed to a method, a computer-readable medium containing a program product for reading an input key as a search string and using the N most significant bits of the input key as an address and reading a leaf pattern and comparing the leaf pattern and returning the longest prefix match found. The distinct feature of the independent claims is that, "using the N most significant bits of the input key as an index into a table representing a plurality of root nodes of search trees."

This distinct feature has been added to the sole independent claims and renders them allowable. It is all the limitations recited in claims 1, 35, 47 and 51 and their all-dependent claims being further limiting and definite are also allowable.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 14-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,553,002 issued to Bremer et al. (hereinafter Bremer).

With respect to claim 14, Bremer discloses a pattern or key that is to be searched (search key; col. 5, lines 43-48; also, col. 11, lines 22-48 and lines 51-55); a direct table that stores a first address location for a search tree (routing table storing the search tree containing the address location for the next router: col. 4, lines 50-53); a plurality of pattern search control blocks that each represent a branch in the search tree (using known methods in the radix tree to traverse the search tree: col. 8, lines 1-15); at least

Art Unit: 2172

one bird representing a partial match of the input key (matching a leaf node as a bird to the search key: col. 11, lines 22-27; also col. 7, lines 40-44); and a plurality of leaves wherein each leaf is an address location for the result of a search (best match is found: col. 11, lines 40-45).

Bremer discloses search key as a key to be search; routing table stored search tree addressing the location of the router; traversing the search tree or radix tree by using the known method; leaf node and the best match found for the leaf node. Bremer does not clearly disclose, "a direct table that stores a first address location for a search tree and one bird representing a partial match."

However, Bremer discloses a routing table stores a search tree or search trie producing the address or location or a router as direct table (col. 2, lines 58-62 and col. 4, lines 50-52; see fig. 14A and fig. 14B); and a leaf node of the search tree as a bird (col. 7, lines 40-44).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to utilize the routing table storing address location for a search tree (col. 4, lines 50-52) and a leaf node (col. 7, lines 40-44) to obtain the best match search key found (col. 11, lines 40-45) as taught by Bremer because it would have made the system using less memory to store a routing table for a search tree (col. 2, lines 10-12), being more efficiently forward data packet (col. 4, lines 35-38) and reducing the searching time (col. 5, lines 15-20) in the searching key with a large address key value environment.

With respect to claim 15, Bremer discloses a lookup definition table

Art Unit: 2172

that manages a tree search memory (col. 4, lines 47-52).

With respect to claim 16, Bremer discloses wherein the lookup definition table comprises entries that define a physical memory that the tree resides in, a size of the key and leaf, and a type of search to be performed (col. 4, lines 66-67 and col. 5, lines 1-32).

With respect to claim 17, Bremer discloses wherein the lookup definition table is implemented in a plurality of memories (col. 10, lines 22-38).

With respect to claim 18, Bremer discloses wherein a format for a direct table entry includes at least one of a search control block; a next pattern address that point to a next pattern search control block; a leaf control block address that points to a leaf or result; a next bit or bits to test; and a direct leaf; a format for a pattern search control block includes at least one of a search control block; a next pattern address that point to a next pattern search control block; a leaf control block address that points to a leaf or result; and a next bit or bits to test; and a direct leaf (col. 8, lines 1-15 and col. 11, lines 22-48).

With respect to claim 19, Bremer discloses wherein a format for a pattern search control block includes at least one of a search control block; a next pattern address that point to a next pattern search control block; a leaf control block address that points to a leaf or result; and a next bit or bits to test (col. 11, lines 22-48).

With respect to claim 20, Bremer discloses a leaf data structure includes at least one of chaining pointer; a prefix length; a pattern to be compared to the search key; and variable user data (col. 12, lines 1-28).

Art Unit: 2172

With respect to claim 21, Bremer discloses wherein the direct leaf is stored directly in a direct table entry and includes a search control block and a pattern to be compared to a search key (col. 8, lines 1-15 and col. 11, lines 22-48).

With respect to claim 22, Bremer discloses wherein a pattern search control block is inserted in the search tree at a position where the leaf patterns differ (col. 8, lines 1-15).

With respect to claim 23, Bremer discloses wherein a pattern search control block has a shape defined by a width of one and a height of one and is stored in a memory that has a line length of at least 64 bits (col. 6, lines 30-51 and col. 8, lines 1-15).

With respect to claim 24, Bremer discloses wherein a pattern search control block has a shape defined by a width of one and a height of two and is stored in a memory of at least 36 bits (col. 6, lines 30-51 and col. 8, lines 1-15).

Contact Information

9. Any inquiry concerning this communication should be directed to Anh Ly whose telephone number is (703) 306-4527 or via E-Mail: **ANH.LY@USPTO.GOV**. The examiner can be reached on Monday - Friday from 8:00 AM to 4:00 PM.

If attempts to reach the examiner are unsuccessful, see the examiner's supervisor, Kim Vu, can be reached on (703) 305-4393.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231


or faxed to: (703) 746-7238 (after Final Communication)

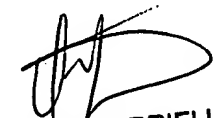
or: (703) 746-7239 (for formal communications intended for entry)

or: (703) 746-7240 (for informal or draft communications, or Customer Service Center, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Fourth Floor (receptionist).

Inquiries of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3900.

AL 
Aug. 6th, 2003


JEAN M. CORRIELUS
PRIMARY EXAMINER